Editors:
Prof. Tsutomu Kambe, University of Tokyo, Japan
Prof. Cornelia Aida Bulucea, University of Craiova, Romania
Prof. Charalampos Arapatsakos, Democritus University of Thrace, Greece

Associate Editors:
Associate Prof. Nikolaos G. Bardis, University of Military Education - Hellenic Army Academy, Greece
Assistant Prof. Klimis Ntalianis, Technological Educational Institute of Athens, Greece

Recent Researches in Environment and Biomedicine

Proceedings of the 6th International Conference on Energy and Development - Environment - Biomedicine (EDEB '12)
Proceedings of the 3rd International Conference on Geography and Geology (GEO '12)

Vouliagmeni Beach, Athens, Greece, March 7-9, 2012

EUROPMENT
TU - Sofia
UNIVERSITÀ DEGLI STUDI DI GENOVA

ISBN: 978-1-61804-075-6

RECENT RESEARCHES in ENVIRONMENT and BIOMEDICINE

Proceedings of the 6th International Conference on Energy and Development - Environment - Biomedicine (EDEB '12)
Proceedings of the 3rd International Conference on Geography and Geology (GEO '12)

Vouliagmeni Beach, Athens, Greece
March 7-9, 2012

Sponsored and Supported by
Universita Degli Studi di Genova, Italy
and
Technical University of Sofia, Bulgaria

UNIVERSITÀ DEGLI STUDI DI GENOVA

TU - Sofia

Published by WSEAS Press
www.wseas.org

ISBN: 978-1-61804-075-6

RECENT RESEARCHES in ENVIRONMENT and BIOMEDICINE

Proceedings of the 6th International Conference on Energy and Development - Environment - Biomedicine (EDEB '12)
Proceedings of the 3rd International Conference on Geography and Geology (GEO '12)

Vouliagmeni Beach, Athens, Greece
March 7-9, 2012

Published by WSEAS Press
www.wseas.org

Copyright © 2012, by WSEAS Press

All the copyright of the present book belongs to the World Scientific and Engineering Academy and Society Press. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the Editor of World Scientific and Engineering Academy and Society Press.

All papers of the present volume were peer reviewed by two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.
See also: http://www.worldses.org/review/index.html

ISBN: 978-1-61804-075-6

North Atlantic University Union

RECENT RESEARCHES in ENVIRONMENT and BIOMEDICINE

Proceedings of the 6th International Conference on Energy and Development - Environment - Biomedicine (EDEB '12)
Proceedings of the 3rd International Conference on Geography and Geology (GEO '12)

Vouliagmeni Beach, Athens, Greece
March 7-9, 2012

Editors:
Prof. Tsutomu Kambe, University of Tokyo, Japan
Prof. Cornelia Aida Bulucea, University of Craiova, Romania
Prof. Charalampos Arapatsakos, Democritus University of Thrace, Greece

Associate Editors:
Associate Prof. Nikolaos G. Bardis, University of Military Education - Hellenic Army Academy, Greece
Assistant Prof. Klimis Ntalianis, Technological Educational Institute of Athens, Greece

International Program Committee Members:
Lajosz Barna, HUNGARY
Andrej Krope, SLOVENIA
Tina Krope, SLOVENIA
Danijela Dobersek, SLOVENIA
Nicolas Abatzoglou, CANADA
Beghidja Abdelhadi, FRANCE
Wael Al-hasawi, KUWAIT
Zakaria Al-Qodah, JORDAN
Omar Othman Badran, JORDAN
Pandelis Biskas, GREECE
Tomas Bodnar, CZECH REPUBLIC
Luis Borges, PORTUGAL
Corneliu Botan, ROMANIA
Arturo Bretas, BRAZIL
Fernando Carapau, PORTUGAL
Sombat Chuenchooklin, THAILAND
Paulo Correia, PORTUGAL
Abdel-Karim Daud, ISRAEL
Paul Deuring, FRANCE
Yue Dong, CHINA
Jassim Gaeb, JORDAN
Mohamed Hassan, KUWAIT
Iraj Hassanzadeh, IRAN
Toshiaki Hishida, JAPAN
Seied Hossein, Hosseiny IRAN
Chun Chang Huang, CHINA
Pei-Hwa Huang, TAIWAN
Niranjan Kumar Injeti, INDIA
Lucio Ippolito, ITALY
J. Janela, PORTUGAL
C.M. Kao, TAIWAN
Sameer Khader, ISRAEL
Stanislav Krasmar, CZECH REPUBLIC
Rainer Krebs, GERMANY
Petr Kucera, CZECH REPUBLIC
Sonia Leva, ITALY
Bugaru Mihai, ROMANIA
Ebrahim Mussavi, IRAN
Jiri Neustupa, CZECH REPUBLIC
Panos Papanicolaou, GREECE
Hassan Rahimzadeh, IRAN
Dong-Hee Rhie, KOREA
Nasreddine Saadouli, KUWAIT
Maria Specovius-Neugebauer, GERMANY
Frank Stagnitti, AUSTRALIA
Mladen Stanojevic, SERBIA and MONTENEGRO
Heiki Tammoja, ESTONIA
Juhan Valtin, ESTONIA
Werner Varnhorn, GERMANY
T.Y. Yeh, TAIWAN
Ruey-Fang Yu, TAIWAN
Chen Yuchen, CHINA
Mohamed Zahran, EGYPT
Jiri Zdenek, CZECH REPUBLIC
Gaetano Zizzo, ITALY
Juan Zolezzi Cid, CHILE
Hans Fernlund, UNITED STATES
Paolo Di Giamberardino, ITALY
Vincenzo Di Lecce, ITALY
Anne-Marie Di Sciullo, CANADA
Zeljko Djurovic, SERBIA
Valentin Dogaru Ulieru, ROMANIA
Tomas Dostal, CZECH REPUBLIC
Maitreyee Dutta, INDIA
Karl Edelmoser, AUSTRIA
Erki Eessaar, ESTONIA
Karim El Guemhioui, CANADA
Hamed Elsimary, EGYPT
Ehsan Esfandiary, IRAN
Mehrez Essafi, TUNISIA
Tchier Fairouz, SAUDI ARABIA
Qi Feng, CHINA
Marta Fernandez, SPAIN
Franco Frattolillo, ITALY
Juan Frausto-Solis, MEXICO
Richard Gallery, IRELAND
Gao Gang-yi, CHINA
Gloria Garc a, SPAIN
Ahmad Ghanbari, IRAN
Baluta Gheorghe, ROMANIA
Ryszard Golanski, POLAND
Alexander Grebennikov, MEXICO
Andrea Guerriero, ITALY
Oscar Gustafsson, SWEDEN
Ofer Hadar, ISRAEL
James Haralambides, UNITED STATES
Suhono Harso Supangkat, INDONESIA
Hafiz Md. Hasan Babu, BANGLADESH
Iraj Hassanzadeh, IRAN
Mohsen Hayati, IRAN
Maria Ines Herrero Platero, SPAIN
Tzung-Pei Hong, TAIWAN
Kuo-Hung Hou, TAIWAN
Michel Houtermans, NETHERLANDS,
Chung-Yuan Huang, TAIWAN

Zhou Huiwei, CHINA
Ren-junn Hwang, TAIWAN
Giuseppe Iazeolla, ITALY
Mohamed Ibrahim, EGYPT
Hirotaka Inoue, JAPAN
Naohiro Ishii, JAPAN
Yousuf Mahbubul Islam, BANGLADESH
Juri Jatskevich, CANADA
Cheng-chang Jeng, TAIWAN
Zhang Jilong, CHINA
C. Jittawiriyanukoon, THAILAND
HJ Kadim ,UNITED KINGDOM
Rihard Karba, SLOVENIA
Stephen Karungaru, JAPAN
Victor Kasyanov, RUSSIA
Osamu Kata,i JAPAN
Demetrios Kazakos, UNITED STATES
Vladimir Kazakov, MEXICO
Ahad Kazemi, IRAN
Mohamad Khaldi, LEBANON
Peter Kokol, SLOVENIA
Samad Kolahi,NEW ZEALAND
Chorng-shiuh Koong, TAIWAN
Guennadi Kouzaev, NORWAY
Deniss Kumlander, ESTONIA
Cheng-chien Kuo, TAIWAN
Dan Lascu, ROMANIA
Mihaela Lascu, ROMANIA
Ljubomir Lazic, YUGOSLAVIA
Minh Hung Le, AUSTRALIA
Shih-kai Lee, TAIWAN
Dong-liang Lee, TAIWAN
Seongkee Lee, KOREA
Yong Woo Lee, KOREA
Huey-Ming Lee, TAIWAN
Somchai Lekcharoen, THAILAND
Sheng-Tun Li, TAIWAN
Chunshien Li, TAIWAN
Ying Li, TAIWAN
Yiming Li, TAIWAN,
Wen-Yew Liang, TAIWAN
Ioan Lie, ROMANIA
S. S. Lin, TAIWAN
Wilfred Lin, HONG KONG S.A.R.
Lily Lin, TAIWAN
Hongbo Liu, CHINA
Ismael Lopez-Juarez, MEXICO
Ye Lu, CHINA
Xiaolin Lu, CHINA
Dan Macodiyo, JAPAN
Zaigham Mahmood, UNITED KINGDOM
Bang-on Makdee, THAILAND
Mrinal Manda,l CANADA
Umar Manzoor, PAKISTAN
Marius Marcu, ROMANIA
Yulin Mei, CHINA
Elisabeth Metais, FRANCE
Liying Mi, JAPAN
Hannah Michalska, CANADA
Wasfy Mikhael, UNITED STATES
Manki Min, UNITED STATES
Huang Minhuan, CHINA
Mihai Mitrea, FRANCE
Payman Moallem, IRAN
Nermin Mohamed, EGYPT
Bouhdai Mohamed, MOROCCO
Farah Mohammadi, CANADA
S. Amirhassan Monadjemi, IRAN
Bartolomeo Montrucchio, ITALY
Eduardo Mosqueira-rey, SPAIN
FRANCEsco Muzi, ITALY
Ibtissem Nafkha, TUNISIA
Benedek Nagy, HUNGARY
Sang-Won Nam, KOREA
Hamed Nassar, EGYPT
Pavel Nevriva, CZECH REPUBLIC
Cat Ho Nguyen, VIETNAM
Elena Niculescu, ROMANIA
Vincenzo Niola, ITALY
Javad Nourinia, IRAN
Juan Jesus Ocampo-Hidalgo, MEXICO
Koji Ohashi, JAPAN
Roland Olsson, NORWAY
Igor Ozimek, SLOVENIA
Ant nio Pacheco, PORTUGAL
Zeljko Panian, CROATIA (HRVATSKA)
Eunkwang Park ,SINGAPORE
Jin Park, UNITED STATES
Federico Perez, SPAIN
Anna Perez, VENEZUELA
Sakthivel Periyasamy, INDIA
Pisit Phokharatkul, THAILAND
Olivier Ponsini, FRANCE
Mircea Popa, ROMANIA
Dan Popescu, ROMANIA
Mihaela Popescu, ROMANIA
Nenad Popovich NEW ZEALAND
Ali Pouyan, IRAN
Marius Preda, FRANCE
Sorapak Pukdesri, THAILAND
Mohammadreza Rafiei, IRAN
Dejan Rancic, YUGOSLAVIA
Nicolas Ratier, FRANCE
Rabin Raut, CANADA
Fuji Ren, JAPAN
Dimitrios Rigas, UNITED KINGDOM
Addison Rios-Bolivar, VENEZUELA
Francklin Rivas, VENEZUELA
Mercedes Ruiz, SPAIN
Jean Saade, LEBANON
Raafat Saade, CANADA
Mohammad Ali Sadrnia, IRAN
Ma Sadrnia, IRAN
Iwata Sakagami, JAPAN

Bouhouche Salah, ALGERIA
Enrique San Mill n, SPAIN
Usiel Sandler, ISRAEL
Oscar SanJuan, SPAIN
Michael Schwarz, GERMANY
Milos Seda, CZECH REPUBLIC
Tsang-Ling Sheu, TAIWAN
Chao-Cheng Shih, TAIWAN
Khalil Shihab, OMAN
YUE Shihong, CHINA
JeongYon Shim, KOREA
Young-chul Shim, KOREA
Jungpil Shin, JAPAN
Vairis Shtrauss, LATVIA
Carmen Simion, ROMANIA
Dharmender Singh Kushwaha, INDIA
Efstratios Skafidas, AUSTRALIA
Suripon Somkuarnpanit, THAILAND
Hua Song, CHINA
Arnd Steinmetz, GERMANY
Rodica Stoian, ROMANIA
Mu-Chun Su, TAIWAN
Pushpa Suri, INDIA
Miroslav Sv tek, CZECH REPUBLIC
Feruglio Sylvain, FREANCE
Sabin Tabirca, IRELAND
Razvan Tanasie, ROMANIA
Shaohua Tang, CHINA
Wang Tao, CHINA
Stanislaw Tarasiewicz, CANADA
Domenico Tegolo, ITALY
Kah leng Ter, SINGAPORE
Spyros Tragoudas, UNITED STATES
Issa Traore, CANADA
Tsung-Han Tsai, TAIWAN
Ruey-Chyn Tsaur, TAIWAN
Shian-Shyong Tseng, TAIWAN
John Tsiligaridis, UNITED STATES
Kazuhiko Tsuda, JAPAN
Hassan Ugail, UNITED KINGDOM
Hans Vandierendonck, BELGIUM
Francisco Vasques, PORTUGAL
Carlos Velez, COLOMBIA
Fernando Vidal, SPAIN
Luige Vladareanu, ROMANIA
Mirela-Catrinel Voicu, ROMANIA
Toshio Wakabayashi, JAPAN
Shuming Wang, TAIWAN
Yi-shun Wang, TAIWAN
Ruye Wang, UNITED STATES
Lin Wilfred, HONG KONG S.A.R.
Lai Wuxing, CHINA
Tianbing Xia, AUSTRALIA
Weiwen Xu, FRANCE
Koichi Yamada, JAPAN
Kiyotaka Yamamura, JAPAN
Thomas Yang, UNITED STATES
Hung-Jen Yang, TAIWAN
Sheng-Yuan Yang, TAIWAN
Kapseung Yang, KOREA
Shun-Ren Yang, TAIWAN
Hung-Jen Yang, TAIWAN
Ping-Jer Yeh, TAIWAN
Jyh-Yeh, UNITED STATES
Hsu-Chun Yen, TAIWAN
Eng-Thiam Yeoh, MALAYSIA
Huifen Ying, CHINA
Tetsuya Yoshida, JAPAN
Enhai Yu, CHINA
Jian Yu ,CHINA
Eugen Zaharescu, ROMANIA
Nadia Zanzouri, TUNISIA
Daniel Zapico, SPAIN
Malika Zazi, MOROCCO
Wenyu Zhang, CHINA
Hong Zheng, CHINA
Hong Zhu, UNITED KINGDOM
Blaz Zmazek, SLOVENIA

Table of Contents

ISBN: 978-1-61804-075-6

Plenary Lecture 1

Biosensors in environmental monitoring – State-of-the-art and perspectives



Dr. Christina Siontorou
Laboratory of Simulation of Industrial Processes
Department of Industrial Management and Technology
University of Piraeus
Piraeus, Greece
E-mail: csiontor@unipi.gr

Abstract: Environmental pollution monitoring and risk assessment currently lies on small-scale field measurements and extrapolations that provide rough estimates of pollution levels and impacts without the potential to make timely diagnosis or early warning. The systematic monitoring of environmental quality parameters is not an easy task technoeconomically, especially when it runs within the scope of producing a detailed and exact picture of the environment dynamics with a view to estimating the impact of pollutants that are expected to enter the ecosystem in the time course, and the cost and effect of the clean-up measures. Working towards such an objective, Nature should be considered in technology terms, modelling its capabilities, specifications, mechanisms, processes, tools, and functions, allowing for biosensors to assume their traditional role of confining natural chemoreception within a device context. Biosensors have been proposed for environmental analysis and screening in early 1990s, on the premises of such advantages and capabilities as high specificity and sensitivity (inherent in the particular biological recognition assay), in situ long-term monitoring with compact small-sized devices, analysis of small-volume samples, and simultaneous selective detection of many substances using multi-array systems. Owing to the high absorptive capacity and transdisciplinarity of biosensor technology, this sector grasped rapidly the breakthroughs in nanotechnology and bioinformatics, offering now the possibility of determining not only specific chemicals but also their biological effects, such as toxicity, cytotoxicity, genotoxicity or endocrine-disrupting effects, i.e., relevant information that, especially in the case of environmental risk assessment, is more meaningful than the concentration of the pollutant itself; they can provide, also, both total and bioavailable/bioaccesible pollutant concentrations, while advanced microfabrication techniques have facilitated the integration of diverse sensor functionalities on the same chip, making system production and automation more convenient. Possibilities and prospects on building tailored micro- or nano-sensors for environmental applications are enormous. In this paper, the current state-of-the-art of environmental biosensors is extensively reviewed under technoeconomic criteria, while certain environmental parameters that should be contemplated in future biosensing strategies are discussed, putting emphasis on specific case examples, drawn for the various projects carried out in the Laboratory of Simulation of Industrial Processes.

Brief Biography of the Speaker:
Dr. C. Siontorou holds a BSc (Hons) in Biomedical Sciences from the University of Sunderland (UK) and a PhD in Analytical Chemistry (2000) from the University of Athens. She worked as a pharmaceutical enterprise consultant on drug development/validation and regulatory affairs (1998-2004) Since 2003, she serves at the Department successively as adjunct lecturer, Lecturer, and now underway for the position of Assistant Professor, specializing in the “Design/Development of Chemical Technology Products”. Her research interests include: biosensors; nanosensors; multi-arrays; environmental metrology; environmental management; product design; design of field detectors; industrial process biosensoring; expert systems; fault diagnosis; knowledge management; technology management; knowledge transfer systems; ontology design. She has 32 publications in highly rated ISI journals and 35 in conference proceedings (of IEEE, CHISA, European Biosensor Society, European Biomass Conferences, etc.) 221 ISI citations and an h-index of 14 (source: ISI Web of Science, Thompson Scientific; self-citations have been excluded). She has recently received the 5th-place award in the 1st i-Bank Innovation & Technology Competition (National Bank of Greece) on the significance of her work on environmental monitoring for the Greek regional development.

ISBN: 978-1-61804-075-6

Plenary Lecture 2

Mast Cells and Histamine in the Pathophysiology of Diabetic Placenta



Prof. Dariusz Szukiewicz
Laboratory of Placental Research
Department of General and Experimental Pathology
Medical University of Warsaw
Poland
E-mail: dariusz.szukiewicz@wum.edu.pl

Abstract: Human placental tissue contains relatively high amounts of histamine (HA) accumulated mostly in the vesicular structures of mast cells (MC). On the basis of neutral protease composition, human MC have been classified into two phenotypes: MCT (tryptase–positive, chymase–negative MC) and MCTC (tryptase–positive, chymase–positive MC) Degranulation of MC releases locally numerous vasoactive, angiogenic and proinflammatory mediators in addition to HA. The role of placental MC and MC-related mediators in normal course and complicated pregnancies are still under investigation. Accumulated data indicate that inflammatory-like processes and changed angiogenesis observed in diabetic placenta may be caused by an imbalance beetween tissular needs and availability of the MC-related mediators. This presentation, based on author's own scientific experience and the results of others, considers placental MC number and their heterogeneity (MCT/MCTC ratio), HA concentration in placental tissue, density of the network of placental vessels, and histamine H1, H2 and H4 receptors expression, with respect to the pathophysiology of diabetic placenta. Analyzed material was limited to the class C of diabetes in pregnancy (after White), the last stage without recognized vascular changes. The results showed that in diabetes class C increased density of the villous network of vessels correlates with both significantly ($p < 0.05$) higher MC number and increased HA concentration. MCT/MCTC ratio was higher ($p < 0.05$ in diabetic pregnancy as well as the immunoreactivity for H4. In conclusion, overview of the results may lead to the suggestion that MC and HA contribute to abnormal function of the placenta in diabetes class C.

Brief Biography of the Speaker:
Dr. Dariusz Szukiewicz is Professor of Medicine and Head of the Department of General and Experimental Pathology at the Medical University of Warsaw, Warsaw, Poland. He is Pathophysiologist and specialist in Obstetrics and Gynecology. He received his medical degree from the Medical University of Warsaw, and completed his Residency and Obstetrics/Gynecology Fellowship at the Medical Centre of Postgraduate Education, Warsaw, Poland. Development of his professional carrer included long term scholarships in the Institute for Basic Research in Developmental Disabilities (IBR), Staten Island, New York, USA and Department of Endocrinology & Reproduction at Erasmus University of Rotterdam, The Nederlands. He is teaching at the interfaculty courses for medical students (topic: Pathophysiology of the Reproductive System) as well as at postgraduate courses for doctors (topic: The Pathophysiology of Pregnancy), both running by the Medical University of Warsaw. Research profile of prof. Szukiewicz is focused on mast cells and their mediators in placental tissue. Based on self-constructed apparatus, he developed the original method of in vitro perfusion of the isolated placental lobule. He also significantly modified a computerized technique for quantitative morphometry. He has published over 100 scientific papers, 10 book chapters, and over 150 conference abstracts.
He is an active member of The American Physiological Society (Teaching and Endocrinology Sections), European Histamine Research Society and Vice-president of The Polish Histamine Research Society. As an internationally recognized expert on placentology and histaminologist he serves on various Grant Review Committees and Editorial Boards worldwide.

ISBN: 978-1-61804-075-6

Authors Index